Bin Yuan Capital All China Strategy – September 2023

Performance Attribution

September was another weak month for the market. Our stock selections in Consumer Discretionary and Industrials contributed positively to performance while our underweight in the Financials and Energy sectors hurt relative performance. An equipment leader in the Information Technology sector also lagged.

The top contributor in September was Haichang Ocean Park. The company posted good H1 earnings with revenue increasing 190% yoy and EBITDA moving from a loss to profit. Visitors in Q3 recovered to 112.4% of the 2019 level on strong demand for tourism. The company is transforming from a traditional park owner to an asset-light park operator, which should improve their balance sheet. Merchandise sales related to Ocean Park's intellectual property of ocean animals and Japanese cartoon characters are driving up in-park spending. A new theme park opened in Zhengzhou in Henan province recently and a new park being planned in Beijing should act as growth drivers in the second half and longer run. As the largest ocean theme park operator in China, Haichang caters to the emerging middle class in the country and is expected to benefit from the growth in domestic tourism.

Autowell underperformed in September. Demand for solar equipment from Europe slowed after the easing of the energy crisis. Over the longer term, solar energy remains an indispensable way to achieve net zero carbon emission objectives and should maintain global growth momentum. Autowell, the leading global manufacturer of photovoltaic (PV) cell stringers with a market share of 70% in 2022 should fully benefit from energy transformation initiatives. They are also moving to become an equipment platform that should benefit from import substitution of related semiconductor equipment.

Market Comment

The latest macro data shows a bottoming of economic activity. Industrial profits had a strong rebound in August to 17.2% YoY growth, reversing a decline in the previous months. Industrial producer ex-factory prices fell 3.0% YoY, the decline narrowed 1.4 percentage points over the previous month. Manufacturing PMI went back to an expansion range of 50.2 in September.

The overall manufacturing sectors are stabilizing. However, low-end sectors will continue to face overcapacity challenges as the global industrial chain moves away from China. High value-added industries are booming. The early stages of import substitution present huge opportunities for emerging globally competitive companies in China. Also, AI has emerged as a transformative force across industries, and China's strength in AI lies in its unique ability to rapidly apply AI innovations to applications, setting the stage for substantial economic impact (please refer to our July monthly newsletter "Intelligent Robots help China open a new chapter in Intelligent Manufacturing" and below our section on "Robot on Wheels: Unlocking the Future of Mobility").

A number of consumer sectors are seeing industry consolidation. Cost effective consumer products will dominate. On one hand, people are pursuing an improvement in their quality of life, but on the other, they are increasingly emphasizing value for money. "Must have" products with distinct functional features are expected to be at the top of shopping lists. Industry leaders with economies of scale and superior innovation efficiency have the competitive edge to meet consumer demands and grow their businesses.

Our portfolio is focused on the high-end technology sectors and under-penetrated consumer sectors that are well positioned to benefit from long term economic trends. We expect them to become future winners that have the potential to dominate their respective market segments. They are trading at a discount relative to their robust earnings growth, historical valuations and global peers. Over 60% of our portfolio companies are actively engaged in stock buybacks or increased holdings by key stakeholders, reflecting a high level of insider confidence in these companies.

There are catalysts under way that will shift the market's focus back to fundamentals, and some are already having an effect. Economic activity is now on a path to stabilization. Remarkable strides in technology, exemplified by Huawei's groundbreaking high-end processor, the Kirin 9000, are reshaping industry dynamics. The market should undergo normalization. Potential policy intervention, particularly with quant trading restrictions, should help to reduce the short-term momentum chasing activities. The active encouragement of long-term capital inflows, facilitated by government support for insurance and national security fund equity investments, should add stability to the market. Short-term negative news is gradually fading away, such as the short-term side effects of healthcare anti-corruption measures. As the market returns to focusing on fundamentals, the Bin Yuan portfolio should recover and outperform the market.

Robot on Wheels: Unlocking the Future of Mobility

Imagine this: On a rainy night, you're comfortably seated inside your car, lost in the gentle strains of music, as your vehicle autonomously navigates its way home. Outside, the visibility is poor, and the roads are slick. Suddenly, the car's advanced sensors detect a potential collision. In an instant, it takes evasive action, deftly preventing a disaster. What's astonishing is that you, as the passenger, remain blissfully unaware of the catastrophe you just narrowly avoided. This isn't a scene from a sci-fi novel, but the magic of autonomous driving—the gateway to the future of mobility.

High costs, limited computational power, and algorithmic challenges have been the bottlenecks of autonomous driving upgrading from the hardware focused 1.0 era, software centric 2.0 era to the real smart vehicle (3.0 era), but changes are taking place. (Chart 1)

**Chart 1.** The Evolution Chart of the Autonomous Driving Era
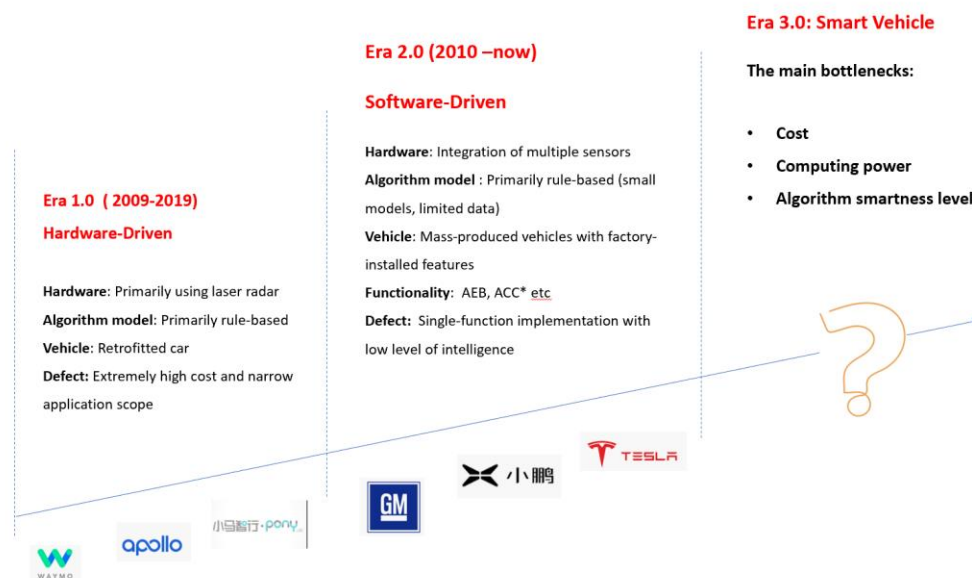
Source: Bin Yuan Capital

Tipping Point – Autonomous Driving Approaches its "iPhone Moment"

The introduction of ChatGPT 4.0 in 2023 completely redefined our understanding of AI capabilities. Beyond chatbots in the virtual world, AI is also deeply integrated into the physical real world of roads and wheels, making the leap to autonomous driving around the corner. The emergence of high performance computational chips has addressed prior power constraints and enhanced computational power strengthens the algorithm, while also reducing costs. The three major bottlenecks limiting the development of the autonomous driving industry are being gradually overcome.

Picture 1. Breaking Industry Bottlenecks through a Virtuous Cycle
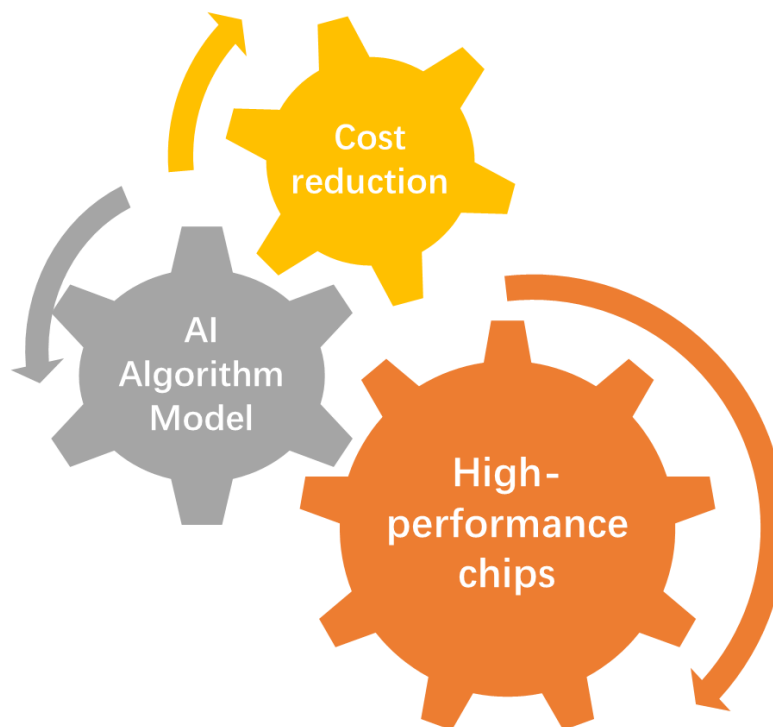
Source: Bin Yuan Capital

Unlike traditional machine learning, AI models possess the ability to self-learn and evolve. This suggests that AI's influence on productivity might not follow a linear trajectory, but rather demonstrate exponential growth. This inherent capability for continuous iteration means that autonomous driving could progress at a pace surpassing general expectations. Driven by advancements in AI technology, there is a strong possibility to anticipate the arrival of a game changing product in the autonomous driving sector soon. In the foreseeable future, the autonomous driving industry is poised to experience its own **'iPhone moment'**, heralding a new era of "Intelligent" advancement. (Chart 2)

**Chart 2.** 'iPhone moment' Drive the Industry's Accelerated Development.
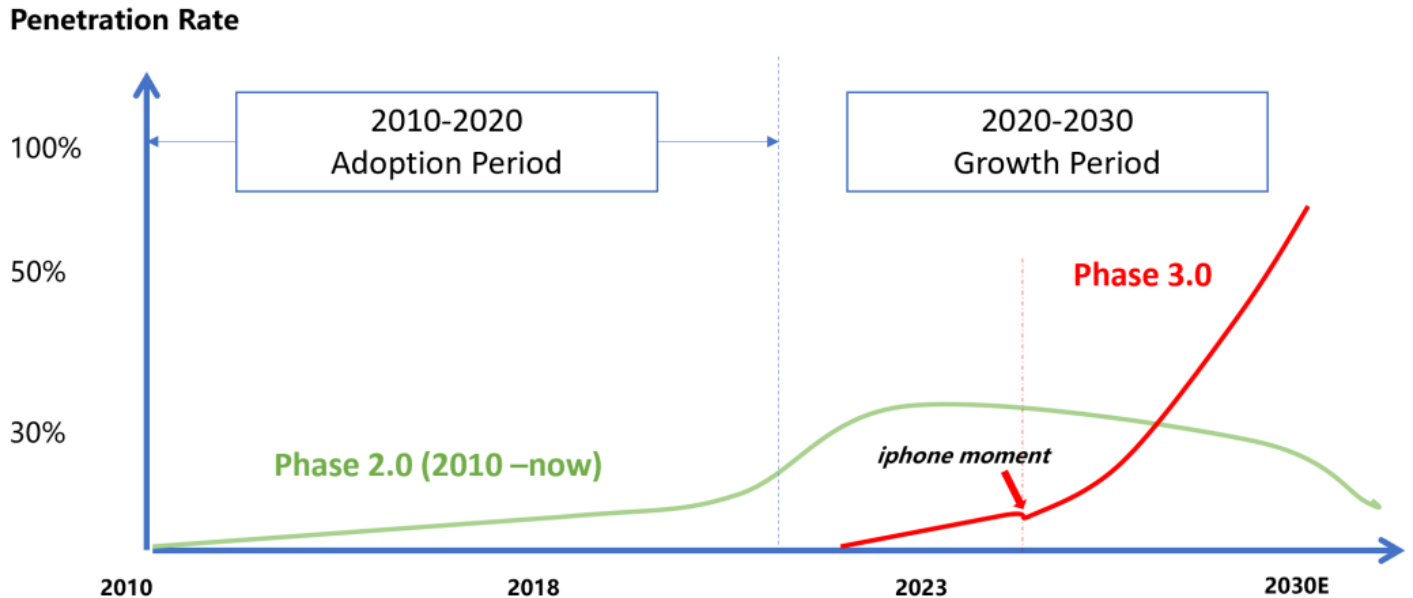
Source: Bin Yuan Capital

Autonomous Driving – Reshaping the Economic Value along the Auto Chain

The era of Autonomous Driving 3.0 will significantly reshape the economic value of the auto industry. The value of individual vehicles will shift to the software and hardware systems that could assist the advanced driving (ADAS: Advanced Driver Assistance Systems).

Hardware - Advanced levels of intelligent driving impose higher demands on the hardware, encompassing sensors, AI chips, actuators, and more (Chart 3). As the number of sensors and their performance improve, the value of an individual car should rise from 4,500 RMB for L2 vehicles to 25,000 RMB for L4 vehicles (Chart 4).

Chart 3. Smart Vehicle Hardware Distribution Map
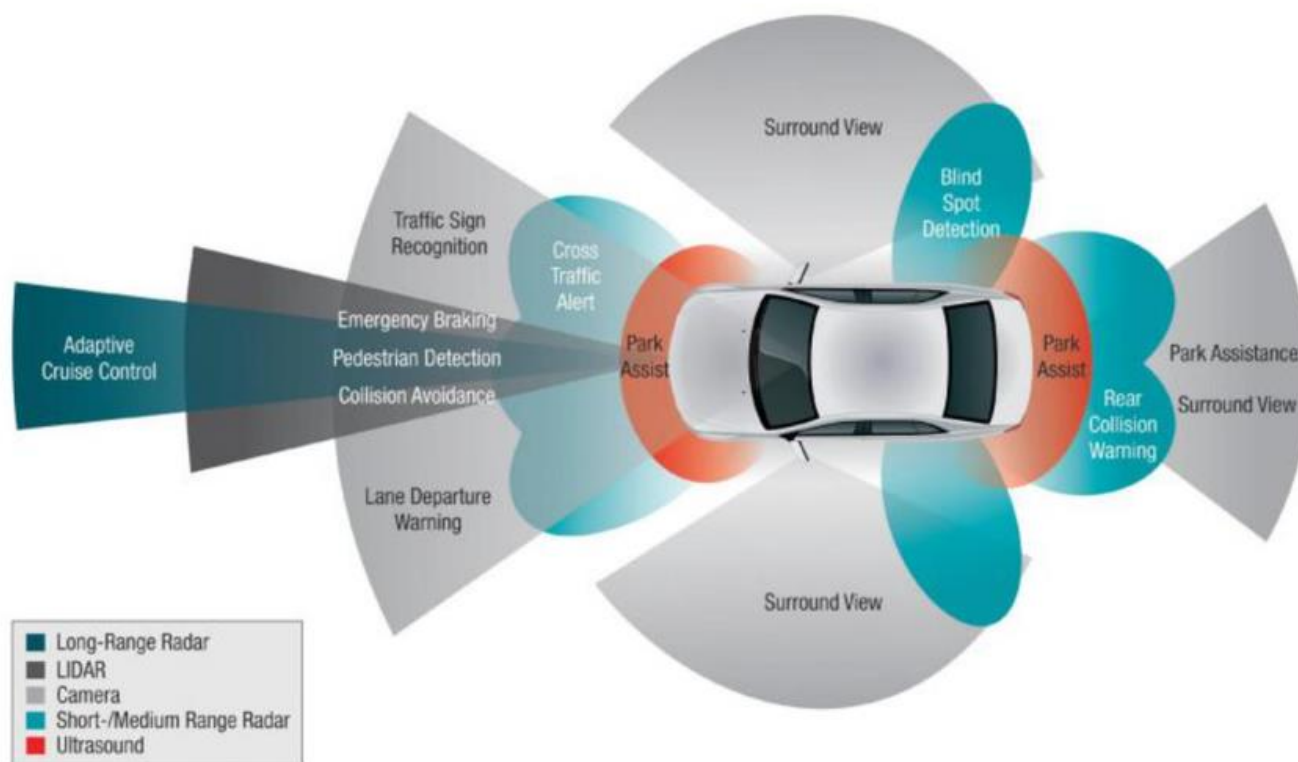
Source: Bin Yuan Capital, Bloomberg

Chart 4. ADAS Components and ASP Trend
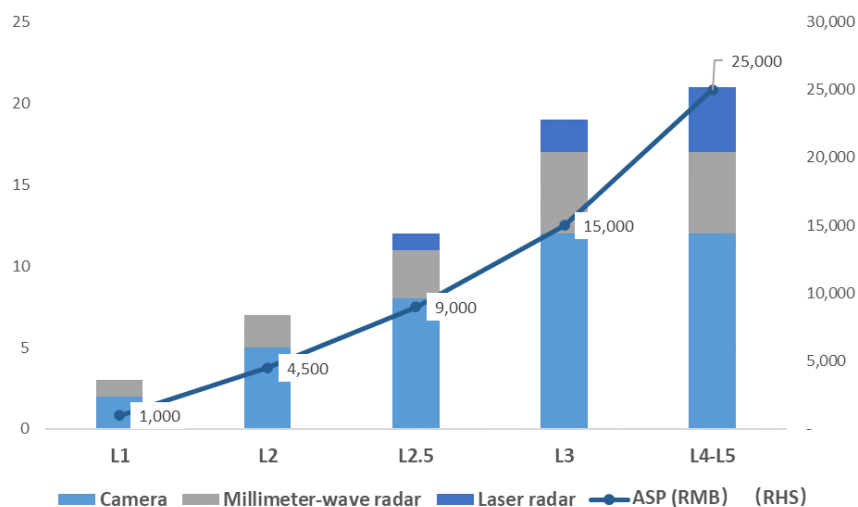
Remark: ADAS (Advanced Driver Assistance Systems), ASP (Average Selling Price)

Source: Bin Yuan Capital, Wind

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Software - Tesla, a leader in this field, has extended the profit lifecycle of smart cars through pre-installed hardware and a software subscription model (SaaS subscription model). For instance, if users wish to utilize the FSD (Full Self-Driving) feature, they need to subscribe to the FSD service in addition to purchasing the car, resembling the subscription approach for mobile apps (Chart 5). Moving forward, this model could evolve further, offering more flexible pricing options such as lifetime purchases, time-based subscriptions, or even pay-per-use arrangements. According to data, the entire intelligent driving subscription market is projected to rapidly grow from its current value of $7 billion to $43 billion by 2030.

Chart 5. TESLA FSD Price Trend
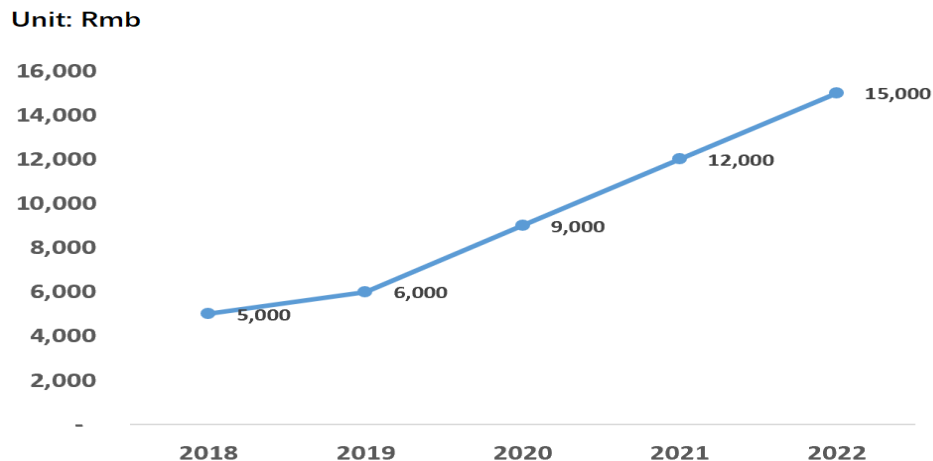
Source: Bin Yuan Capital, TESLA Website

With the rise in market penetration, increased value per vehicle, and the widespread adoption of the subscription model, the overall market size for ADAS is expected to expand from the current $43 billion to $254 billion by 2030. (Chart 6)

Chart 6. Global ADAS Market Size

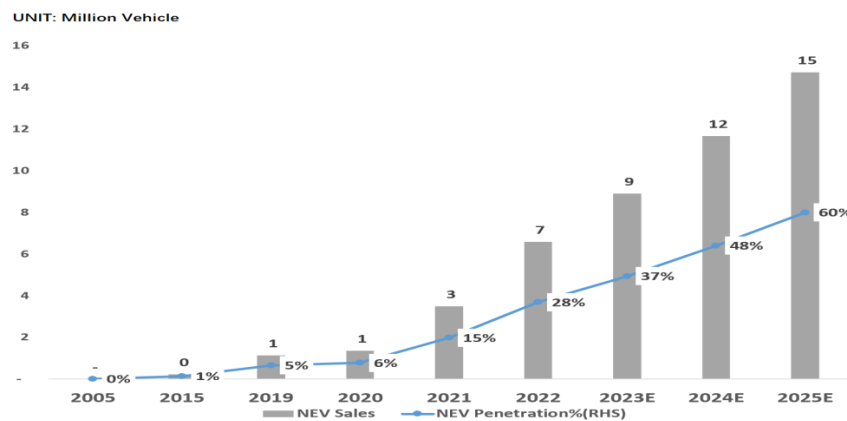
Source: Bin Yuan Capital, Bloomberg

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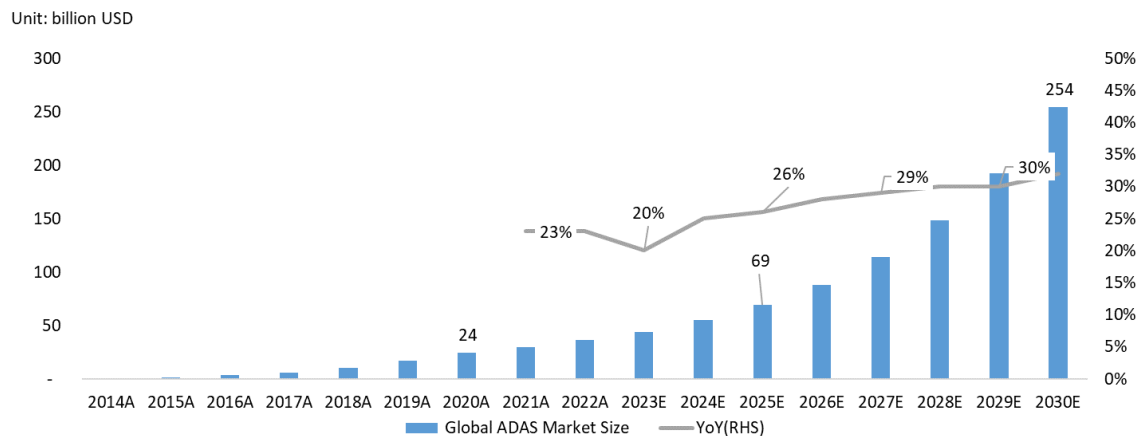
China Possesses a Leading Edge in the Market Application

China's strength in AI is different from US innovation. China uniquely excels in rapidly applying AI innovations to practical applications, paving the way for substantial technological advancements and significant economic impact.

Electrification serves as a pivotal precursor and foundation for intelligent advancement. Given their superior mechanical performance and power systems, electric vehicles are the ideal platforms for intelligent cars. With an early start in the field of new energy, it's anticipated that by the end of 2023, the penetration of new energy sources in China will near 40% of new car sales, laying a solid foundation for the industry's transition to intelligence (Chart 7).

Chart 7. The New Energy Vehicle (NEV) Sales and Penetration Rate in China

Source: Bin Yuan Capital, Wind

A robust advantage lies in the comprehensive industrial chain. China boasts the world's most mature automotive manufacturing and smartphone industry chains. The intelligent vehicle industry chain intersects profoundly with these two sectors. A well-established industrial chain infrastructure robustly supports the entire automotive sector's shift towards intelligence. (Chart 8) (For further details on the industrial chain's advantages, refer to our July 2023 monthly letter)
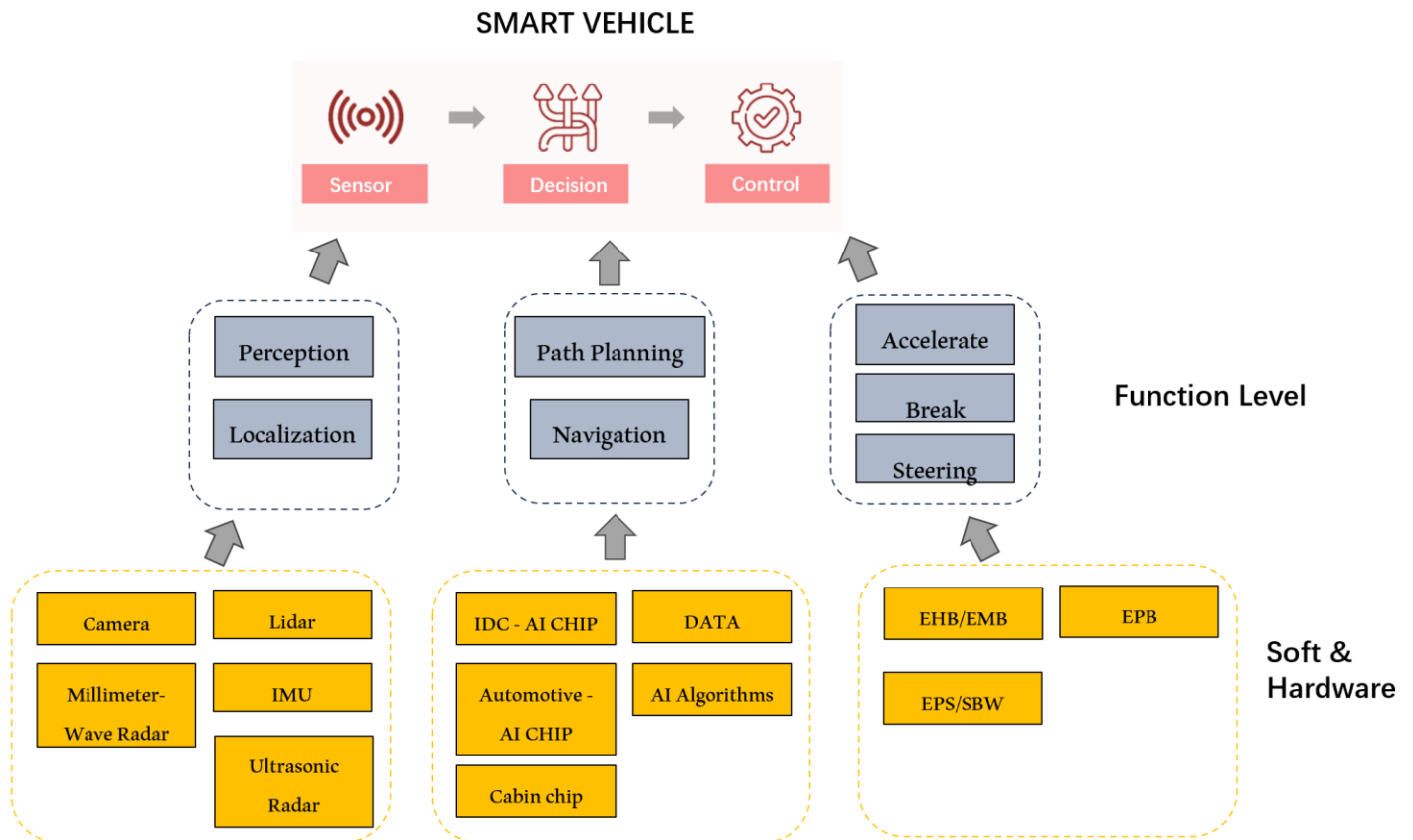
Chart 8. Overlapping Supply Chains
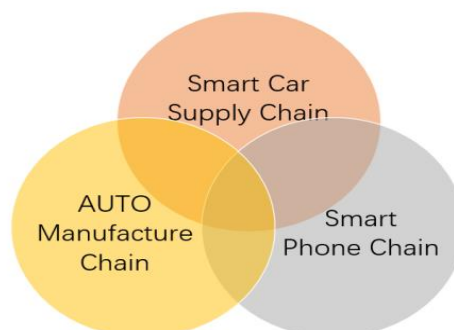
Source: Bin Yuan Capital

Investment Opportunities

Compared to traditional cars, autonomous vehicles have undergone significant upgrades mainly in three core areas: Sensor (Perception) Layer, Decision Layer and Control Layer (Chart 9).

Chart 9. Smart Car Hardware and Function Pyramid

SMART VEHICLE

Remark: EPS – Electric Power Steering; SBW - Steering-by-Wire; EPB - Electronic Parking Brake; IMU - Inertial Measurement Unit; EHB/EMB - Electric Hydraulic Brake/ Electromechanical Brake

Source: Bin Yuan Capital

The **expansive market scope** combined with the **high entry barriers** in the industry paves the way for the emergence of companies with significant investment potential. (Chart 10)

Chart 10. The Investment Opportunity Chart
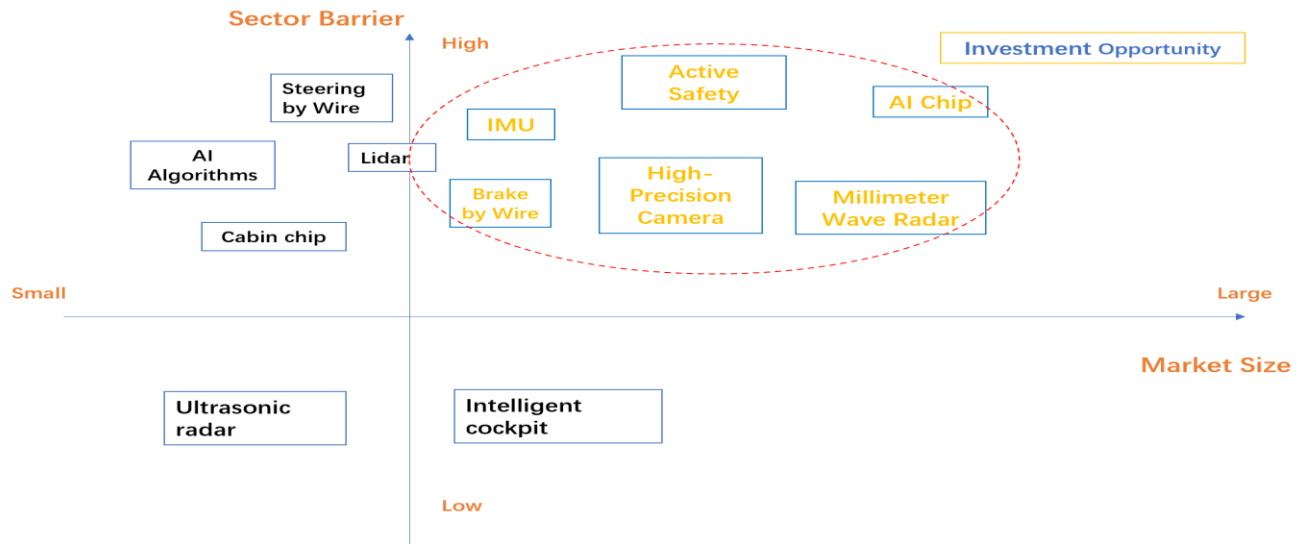
Source: Bin Yuan Capital

1. Sensor (Perception) Layer: The Sensory System of Intelligent Vehicles.

The autonomous driving system relies heavily on an array of sensor components, including cameras, radars, Inertial Measurement Units (IMU), and Vehicle-to-Everything (V2X) communication technologies. Led by Tesla's innovations, a visual solution combined with high-precision IMU is becoming the mainstream choice for Advanced Driver Assistance Systems (ADAS) (Chart 11).

Chart 11. Value Chain of Sensory System
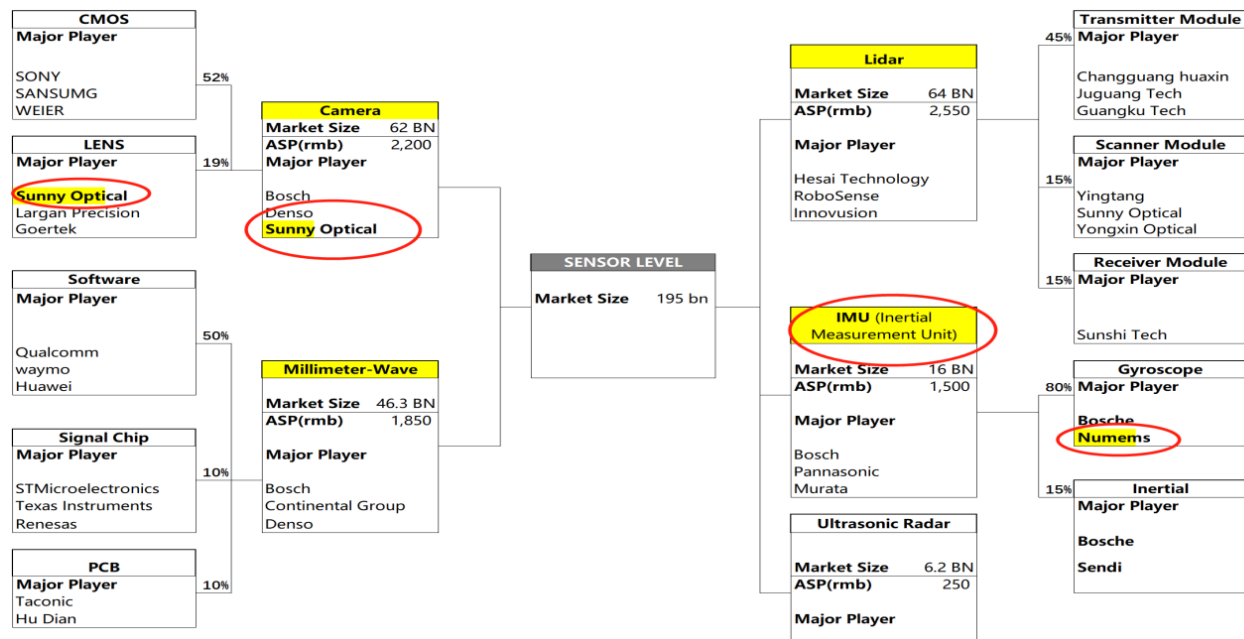
Source: Bin Yuan Capital

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Visual Solution: From L2 to L4 levels of autonomous driving, the number of cameras will increase from 5 to 15. The total pixel count will see a 23-fold rise, concurrently enhancing the value of each vehicle (Chart 12). **SUNNY OPTICAL (2382.HK)** is a leading Chinese manufacturer of optical products, based on three core technologies. It develops optical, instrument, and photoelectricity businesses. The company's lens and camera modules have been widely used by a large number of automotive manufacturers, like BYD, Benz, Xiaopeng, among others.
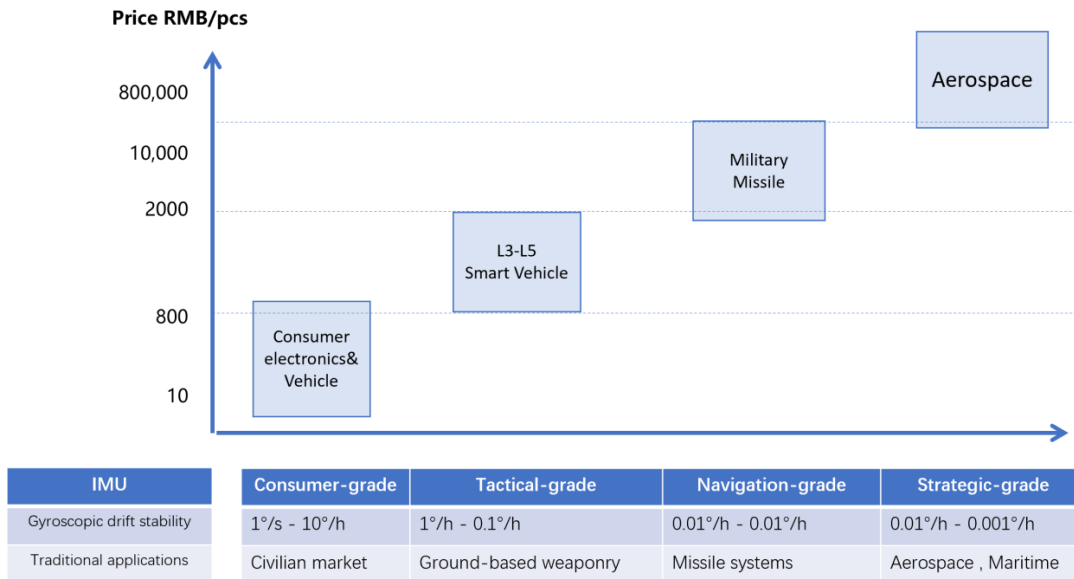
Chart 12. Camera Update Trend from L2-L4

Camera Upgrade	L2	L3	L4
Front-facing Camera	1* 2MP	2* 8MP	2*12 MP
Panoramic Camera	4* 1.3MP	4* 2MP	
Side-view Camera		4* 2MP	4* 8MP
Rear-view Camera		1* 2MP	1* 8MP
Driver Monitoring System Camera		1* 2MP	2* 8MP
Interior Monitoring System Camera		1* 2MP	1* 8MP
Total Camera	5	13	15
Total Megapixels	7.2	38	88
ASP per car	1500	3000	5000

MP= Megapixels

Source: Bin Yuan Capital, Wind

High-Precision IMU: Just as human drivers need to know their exact location to drive correctly, intelligent driving systems have a strict demand for accurate positioning. The higher the level of autonomous driving, the greater the need for location precision. IMUs can be categorized into strategic, navigational, tactical, and consumer levels based on their accuracy. Today, low-precision consumer level IMUs no longer meet the increasingly stringent demands of smart cars. As a result, high precision IMUs (tactical level and above) are becoming the industry standard. (Chart 13). **Numems (688582.SH)** is a leader of MEMS inertial sensors manufacturer in China. Its products such as the IMU chip have been widely recognized in the aerospace industry and have begun to expand to the autonomous driving market, which is expected to provide new revenue growth opportunities.

Chart 13. Various Applications and Price Ranges of IMUs

| IMU	Consumer-grade	Tactical-grade	Navigation-grade	Strategic-grade
Gyroscopic drift stability	1°/s – 10°/h	1°/h – 0.1°/h	0.01°/h – 0.01°/h	0.01°/h – 0.001°/h
Traditional applications	Civilian market	Ground-based weaponry	Missile systems	Aerospace , Maritime

Source: Bin Yuan Capital, NUMEMS Website

2. Decision layer: The Super Brain of Intelligent Cars

The decision module stands as the pivotal component determining the "intelligence" of the entire autonomous driving system. It is composed of algorithm models and computational power (Chart 14).

Chart 14. Value Chain of Decision Layer
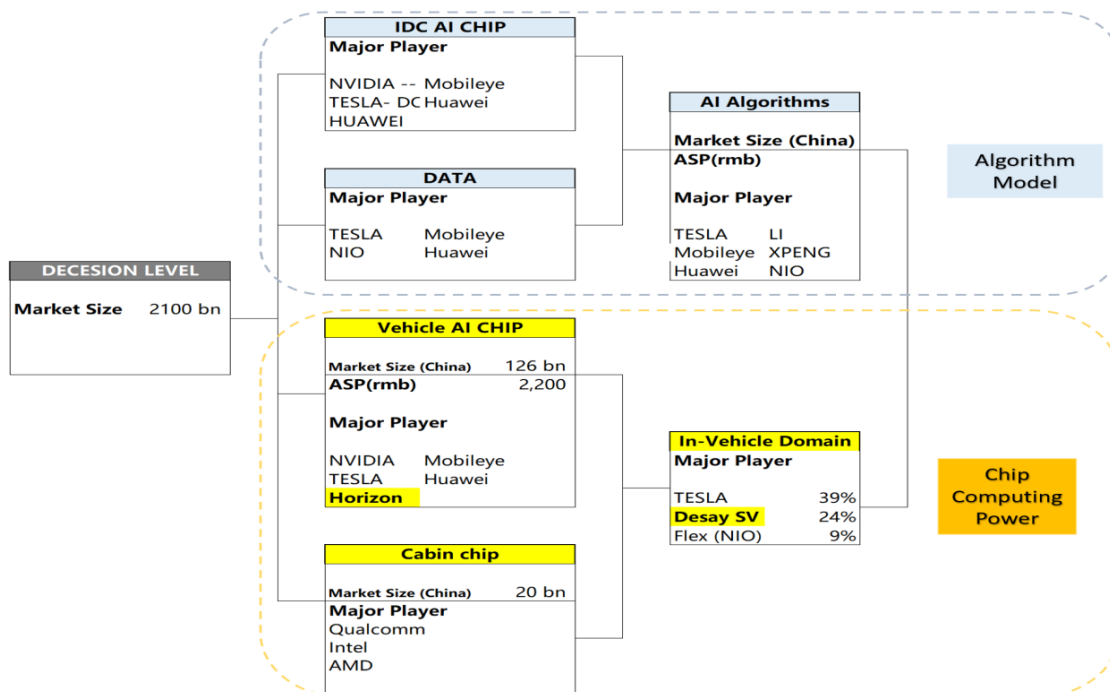
Source: Bin Yuan Capital

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AI Algorithms Breaking Industry Barriers: Recent advancements, bolstered by the incorporation of large AI models, like the "*Transformer+ Bird's Eye View (BEV)+Occupation*" deep-learning-based driving algorithm, showcase significant self-iterative prowess. The emergence of AI algorithms has accelerated the research process and improved the innovation efficiency, unveiling a new era for autonomous driving technology. (Chart 15).

Chart 15. Performance between Deep Learning and Machine Learning
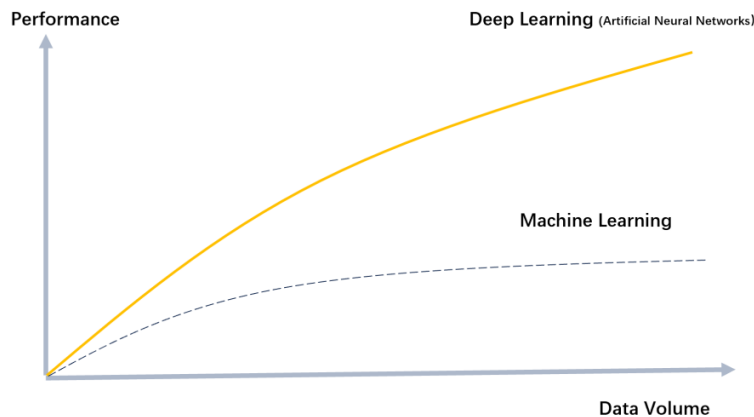
Source: Bin Yuan Capital, 《Principles and Practices of Autonomous Driving 2019》

High-Performance Chips Providing Robust Support: As autonomous driving levels advance, the scale of data collected per unit of time exponentially increases, thereby demanding significantly enhanced processing capacities from computational chips. According to reports from Horizon Robotics, the computational requirement for AI chips leaps from a basic 9 TOPS (Tera Operations Per Second) for L2 to 129 TOPS for L3 and further to 448 TOPS for L4 — a staggering 50-fold increase. (Chart 16) This "super brain" is propelling a new arms race in the intelligent car industry. In this domain, although Chinese component companies like **Horizon (to be IPO)** had a later start, they have been consistently striving to bridge the gap vs. foreign peers, which is continually narrowing (Chart 17).

Chart 16. The Computational Requirement for AI chips
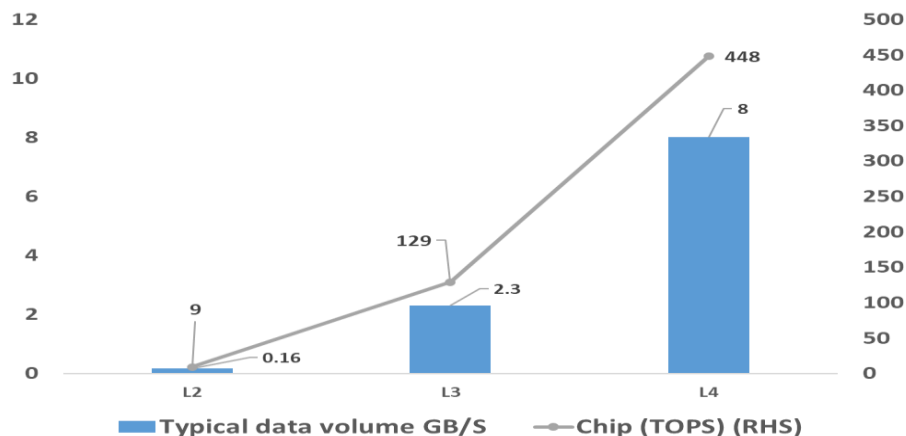
Source: Bin Yuan Capital, Horizon Website

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Chart 17. Performance Comparison Among Chips from Different Manufacturers

AI CHIP COMPARISON	TESLA	NVIDIA	Mobileye	Huawei (CN)	Horizon (CN)	
Chip Name	FSD	Orin	Eye Q5	MDC 610	J3	J5
YEAR	2019	2022	2021	2019	2020	2021
Manufacturing process	14 nm	7nm	7nm	12nm	16nm	16nm
AI processing capability	72 TOPS	200 TOPS	2*12TOPS	160 TOPS	5 TOPS	96/128 TOPS
OEM	TESLA	NIO,XPENG,LI	GAC, GEELY	BAIC,CHAGNAN	SAIC,GWM,LI,BYD,NATO	AIC,GWM,LI,BYD,NATO

Source: Bin Yuan Capital, Wind

### 3. Control Layer: The Action Medium of Intelligent Cars:

Once a vehicle achieves perception and decision-making capabilities, the control module comes into play, governing the vehicle's operations. This segment typically aligns with the car's chassis system and is crucial for safety.

By-Wire Systems for Precise Operations: Aiming to offer timelier and more accurate control capabilities, the entire chassis system is transitioning towards by-wire systems, encompassing electronic brake-by-wire (BBW) and steer-by-wire (SBW). Due to their technical complexity, BBW and SBW are still in their introductory phase. It is projected by Gaogong Industry Institute (GGII) that the penetration rates of BBW and SBW in total new auto sale in China will rise from 10% and 2% in 2022 to 72% and 25% by 2030, respectively. (Chart 18 & 19).

Bethel Automotive (603596.SH), situated in Wuhu, China, is a leading automotive component manufacturer. The company is renowned for its expertise in wire-controlled drive technology, with specialization in braking products like brake calipers, brake discs, EPB, ESC, and WCBS. Renowned automotive brands such as Chery, Li Xiang, and Changan count on Bethel's advanced solutions. Notably, their integrated wire-controlled drive product stands out for its superior integration and cost-effectiveness, and it has begun to supplant Bosch's iboost series products in the market.

Megmeet (002851.SZ), **is** a high-tech company that focuses on power electronics and industrial control technology. Through the core algorithm and control strategy, Megmeet can produce high efficiency motor control units for electric vehicles in each control system which can reduce the electrical control loss of the motor, improve the energy-saving effect, and increase the cruising range.

Chart 18. Brake-by-wire and Steer-by-wire (SBW) Introduction by Mando
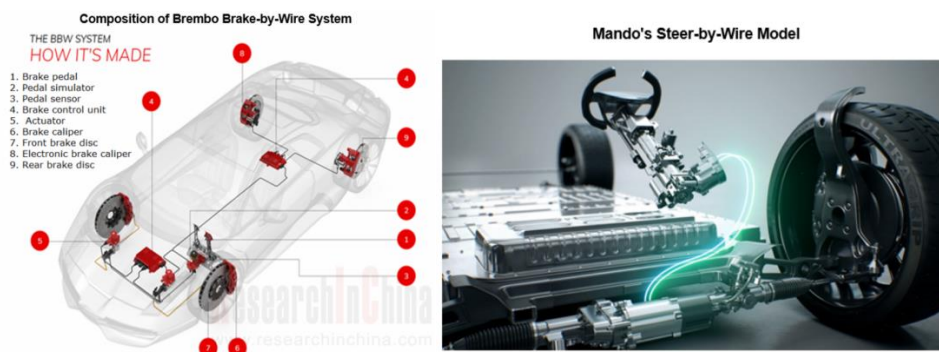
Source: Mando Website

Chart 19. Brake-by-wire (BBW) and Steer-by-wire (SBW) Penetration Rate Trend
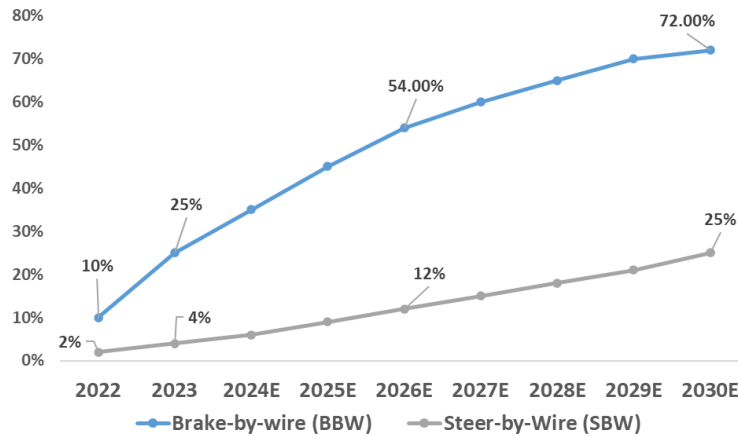
Source: Bin Yuan Capital, Wind, Gaogong Industry Institute (GGII)

Active Protection for Enhanced Safety: Future intelligent vehicles will be predominantly based on 400V or even higher voltage platforms, facilitating swift and precise power operations. High voltage and current heighten the demands for system-wide safety. Fuses play an indispensable role in quickly disconnecting circuits during short-circuit events, preventing further damage and safeguarding property and lives. (Chart 20) Compared to conventional fuses, fast-acting fuses, with their rapid response time, reduce risks and are poised to become a standard feature in future intelligent cars. (Chart 21).

Sino Fuse (301031.SZ), founded in 2007, is a fast-growing company that is committed to the R&D, production and sale of circuit protection devices, fuses and related accessories. Its newly innovated product "Pyrofuse" (a type of incentive fuse) can improve the safety of electric vehicles when there is a collision or abnormal current. The company should benefit from the trend of increasing safety requirements for electric vehicles in the future.

Chart 20. The Fuses Introduction

Source: Sinofuse Website

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Chart 21. Incentive Fuse has a Faster Response Time

Product Name	Technical Parameters	Response time	ASP
Incentive Fuse	500V,1000V	<2ms	88 RMB/PCS
Traditional Fuse	500V,750V,1000V	5-10ms	25 RMB/PCS

Source: Bin Yuan Capital, Sinofuse Website

Summary

The influence of AI technology on the overall societal development is expected to be unparalleled, far exceeding our imagination. The capabilities of deep learning and self-evolution position AI as the driving force for innovation and growth across various industries. With its vast market and robust industrial ecosystem, China stands to greatly benefit from this technological revolution. Being on the ground in China allows our team to investigate the whole value chain in the different sub-sectors. Identifying and investing in companies with transparent, sustainable competitive advantages in those sub-sectors should deliver long term exceptional investment returns.

Sincerely,

Ping and the Team

October 6, 2023

Bin Yuan on the Road

September 22, 2022

We visited Sinopharm Group (the largest medical distributor in China) to learn about the future of medical distribution industry.

As policy moves forward, anti-corruption campaigns and value-based procurement policies are reshaping the medical distribution market. Small distributors are unable to meet the new demand from hospitals, so leading companies, such as Sinopharm Group, should have opportunities to take market share. The company believes that in the long term, medical reform will dramatically improve the delivery cycle and increase distributor profitability.

"The medical distribution market is getting bigger and bigger, and we're grabbing a bigger share of it." – Company Secretary Mr. Wu.

September 18, 2023

We visited home furnishing-related companies in Guangzhou to get updates on the industry after a series of support policies for real estate.

We visited home-decoration shopping malls, manufacturers of sofas, mattresses, wooden furniture, toilet products, etc. and communicated with store employees, industry experts, and company managements. They all reported a recovery of customer traffic in September, although confidence in the industry remained weak. Leading players were performing better than their peers. Customized products/solutions providers such as Oppein and Suofeiya have the potential to increase market share once demand recovers.

"We are focusing on home furnishing channels to reach more customers and increasing cross sales to maintain revenue growth." – Management of a customized furniture company.

Sep 22, 2023

We visited Chaozhou Three-Circle Co., Ltd (a multilayer ceramic capacitor (MLCC) manufacturer) to check the progress of company's MLCC business.

Through communication with the company's sales director, Mr. Liu, and board secretary, Ms. Wu, we noticed that as downstream demand gradually recovers, the capacity utilization rate of the company's MLCC product line has increased from less than 70% in the second quarter to around 80% in the third quarter. At the same time, the company's competitive advantage has further improved with product upgrading to high capacity MLCC products. Currently, high-capacity products account for more than half of the company's MLCC revenue. We expect that the company's market share in the MLCC market will continue to increase as the import substitution trend continues, which should bring robust growth to the company's performance in the future.
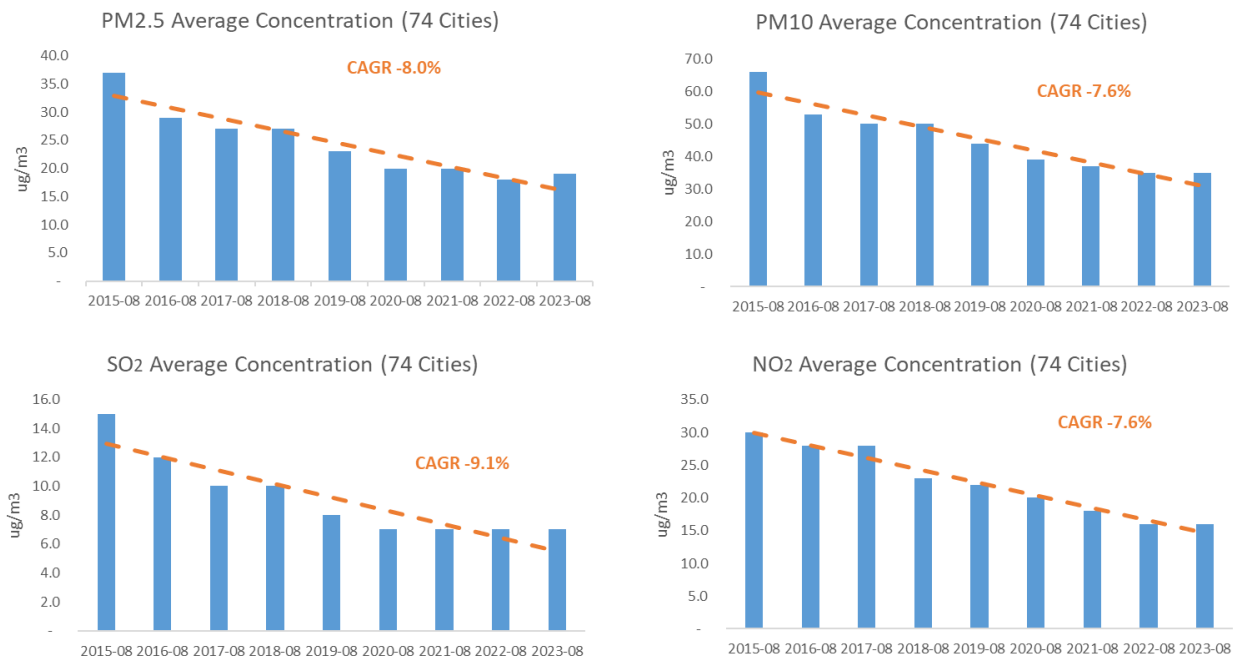
"Relying on the advantages of materials and processes, the competitive advantage of CCTC will be further enhanced." – Mr. Liu, Sales Director of CCTC.

Bin Yuan Environment Tracking

This tracking includes monthly air and water quality data, both showed steady improving trend in the last 5 years. Air pollution concentration dropped due to reduced coal combustion, increased proportion of new energy vehicles, and tightened emission control measures. Water quality improved mainly from the strengthen control of wastewater emissions since 2017.

China air pollutant concentration data August 2015-2023

PM2.5 Average Concentration (74 Cities) — CAGR -8.0%

PM10 Average Concentration (74 Cities) — CAGR -7.6%

SO$_2$ Average Concentration (74 Cities) — CAGR -9.1%

NO$_2$ Average Concentration (74 Cities) — CAGR -7.6%

*PM2.5, PM10 and SO$_2$ are mainly from fossil fuel combustion, and NO$_2$ is mainly from vehicle emissions.

The proportion of high-quality water in China data August 2016-2023

Proportion of High Quality Surface Water — I+II+III, I+II
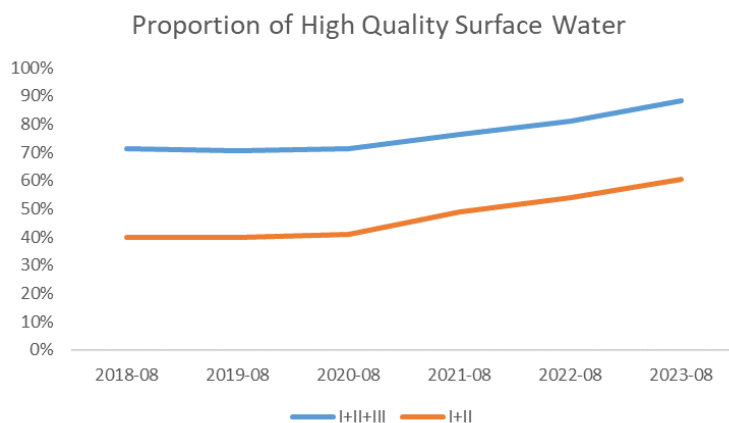
*Water quality in China breaks down to 5 levels, with level I being the best and level V being the worst. Level I+II represents water that can be used for drinking purpose. Level I+II+III represents water that can directly contact human body.
*Source: Ministry of Ecological Environment in China.

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